

claimed subject matter of claims 13-24, asserting:

The references are relied upon for teaching forming a solder ball prior to being dispensed on the substrate.

Applicants assume herein that the Examiner is referring to the Smith and Yost references, relied upon to supplement the primary combination of JP '276 and Nakasu in the rejection of claims 13-24 in the Office Action mailed January 9, 2003 at pages 4-5. (As discussed hereafter, Smith and Yost are now combined with Takamori and Konishi et al. references, newly cited in the present Office Action. Confirmation of that assumption is requested.

ITEM 3: CLAIM REJECTIONS-35 USC § 103 ON NEW GROUNDS

REJECTION OF CLAIM 1 FOR OBVIOUSNESS UNDER 35 USC § 103(a) OVER TAKAMORI IN COMBINATION WITH KONISHI ET AL.

Claim 1 stands rejected under 35 USC § 103(a) as being unpatentable over Takamori in combination with Konishi et al. The Examiner argues that Takamori "monitors the spreading of the resin and controls either the speed of the spinning and/or amount of resin applied to produce the desired coating." (Item 3, at page 3)

The rejection is respectfully traversed.

TAKAMORI

Takamori teaches applying a coating solution approximately at the center of a rotating substrate and monitoring a "spreading state" of "the outline of the outer periphery of the coating solution..." as it diffuses, or spreads, from almost the center of the rotated substrate to an outer edge thereof. (Col. 2, lines 23-29, 33-37 and 50-61, col. 3, lines 1-8, col. 9, lines 15-20 and 44-60, col. 10, lines 53-60, col. 11, lines 10-43, col. 13, lines 53-65 and claim 1 at col. 14, lines 36-41)

Takamori, more specifically, monitors the condition at the outer periphery of the spreading solution to detect a "break" therein, characterized as a "scratch pad" (Col. 1, line 48-- and see throughout specification at above-cited portions) and, thereupon, to adjust the speed of rotation or the amount of solution being applied (see, e.g., col. 9, lines 55-60); see also, scratch

pad in Fig. 14 at points where arrowheads extend beyond outer boundaries of circumference of diameter d.)

THE CLAIMED INVENTION

In accordance with the invention as recited in claim 1, a controlled amount of resin is extruded onto a printed wiring board and then spread thereon by centrifical force and, further, the method comprises:

- imaging an external appearance of the resin, as spread on the printed wiring board ;
- determining a surface area of the spread and imaged resin; and
- automatically adjusting the controlled amount of the resin based on the determined surface area of the spread and imaged resin.

As discussed at pages 17-18 of the specification, the imaging step is characterized as involving the "external appearance of the resin 22" (page 17, lines 30-31) and is further discussed at pages 18-19, concluding with the statement:

...[A]ccording to the present embodiment, the surface area can be obtained using just the diameter of the substantially circular shape formed by the spreading resin 22, thus making image analysis easy and quick.

Based on the surface area data obtained as described above, a correlation is found between surface area and coating amount by referring to a table of such correlations.

TAKAMORI DOES NOT SUGGEST NOR DOES IT RENDER OBVIOUS THE PRESENT INVENTION

Takamori thus monitors the manner of spreading, or "spreading state" of the resin, particularly, to detect the existence of a "scratch pad" at the outer periphery of the spreading resin. By contrast, the present invention monitors the surface area of the spread and imaged resin. Thus, whereas the object of Takamori is to avoid the occurrence of the foregoing scratch pad or disconnection of the spread resin, the present invention addresses the problem of supplying the resin exactly controlled amount. Takamori is entirely silent about the step of

"determine a surface area of the spread and imaged resin"--and, it follows, necessarily, that Takamori has no teaching or even suggestion of "automatically adjusting the controlled amount of the resin based on the determined surface area of the spread and image resin." as recited in claim 1.

KONISHI

Konishi is cited by the Examiner in item 3 of the Action as teaching a process similar to that of Takamori "where centrifugal forces are utilized to form a uniform coating on a circular substrate."

Konishi teaches the use of spin chucks (as to the prior art at col. 1, lines 34-43 and also as to the disclosed Konishi invention at col. 4, lines 55 et seq.); however, the principle feature of spinning, addressed by Konishi, is to quickly dry the semiconductor disks. Hence, Konishi is basically irrelevant to the present invention and certainly no more pertinent than Takamori, even when taking into account that Konishi discloses applying the resin coating method thereof to printed boards.

THE COMBINATION OF TAKAMORI AND KONISHI FAILS TO RENDER THE CLAIMED INVENTION RECITED IN CLAIM 1 OBVIOUS

The foregoing is submitted to clearly establish that the combination of Konishi and Takamori fails to render obvious (§ 102) the present invention as set forth in claim 1.

REJECTION OF CLAIMS 6 AND 7 FOR OBVIOUSNESS UNDER 35 USC § 103(a) OVER TAKAMORI AND KONISHI TAKEN FURTHER IN COMBINATION WITH NAKASU

Claims 6 and 7 stand rejected under 35 USC § 103(a) as being unpatentable over Takamori in combination with Konishi et al. further in combination with Nakasu et al.

The Examiner argues that Nakasu et al. depicts monitoring a dispensed droplet of coating material by a sensor 25 prior to contacting the substrate or monitoring the residual material on the nozzle.

The rejection is respectfully traversed.

The sensor 26 of Nakasu is merely provided for detecting the presence/absence of dropping of the fused solder (e.g., from the opening 7 in Fig. 3; see, col. 8, lines 47-66). There is no teaching in Nakasu about "imaging an external appearance of a resin drop" and "determining a diameter of the resin drop from the image thereof", as recited in claim 6.

Thus, the subject matter of claim 6 is not rendered obvious, even if Nakasu is properly combinable with Takamori and Konishi, which applicants dispute.

With regard to claim 7, all of the references are entirely silent about washing of the nozzle.

Thus, the subject matter of claim 7 is not rendered obvious, even if Nakasu is properly combined with Takamori and Konishi, which applicants dispute.

REJECTION OF CLAIMS 13-24 FOR OBVIOUSNESS UNDER 35 USC § 103(a) OVER TAKAMORI AND KONOSHI IN COMBINATION WITH NAKASU, SMITH ET AL. OR YOST ET AL.

The rejection is respectfully traversed.

Each of the above references is discussed either in the prior response or hereinabove and, it is submitted, has been shown to be insufficient, taken singly or in any proper combination, to support the obviousness rejections.

Moreover, each of these claims is dependent, directly or indirectly, from a respective one of the independent claims 1, 6 and 7, which have been shown above to patentably distinguish over the basic combination of Takamori, Konishi and Nakasu et al. and, hence, these dependent claims patentably distinguish over the further combination for at least the same reasons as the respective independent claims and, additionally, for the further recitations thereof.

CONCLUSION

In accordance with the foregoing, it is submitted that the claims pending herein patentably distinguish over the references of record, taken singly or in any proper combination, and that the application is in condition for allowance, which action is earnestly solicited.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: July 23, 2003

By: _____

H. J. Staas

Registration No. 22,010

1201 New York Avenue, NW, Suite 700
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501